IN THE SPECIFICATION:

On page 11, please amend the paragraph beginning on line 19 as follows:

Fig. 4A illustrates an example of a network topology backplane bus architecture including two or more resource enclosures or cabinets 200_1, 200_2 through 200_N (not shown). Resource enclosures ~~200~~ each include two, or more modules, ~~210', 210" through 210~~^{N}, each module hosting one or multiple application functions and sharing ~~the~~ <u>a</u> backplane bus 212. ~~In Fig. 4A, m~~<u>M</u>ultiple modules ~~210' through 210~~^{n} are preferably divided into two groups physically isolated in resource enclosures 200_1 and 200_2. For example, three or more modules $210_1'$, $210_1''$ through 210_1^N are installed in one resource enclosures 200_1 and another three or more modules $210_2'$, $210_2''$ through 210_2^N are installed in another physically isolated resource enclosure 200_2. Within each resource enclosure 200 modules 210' through 210^n intercommunicate via fault tolerant data bus 212 of the invention. The two groups of modules $210_1'$ through 210_1^N and modules $210_2'$ through 210_2^N also intercommunicate via fault tolerant data bus 212 of the invention.

On page 12, please amend the paragraphs beginning on line 23 as follows:

Fig. 4B illustrates one embodiment of the invention incorporating the microprocessor based systems of the aircraft IHAS 10 system, shown in Fig. 1. In Fig. 4B, IHAS 220 system module may host applications of any criticality level from non-essential to flight critical. As described above, the central computer 18 (shown in Fig. 1) of the IHAS 220 system uses conventional programs for generating the basic ground proximity warnings (GPWS) including enhanced ground proximity warnings (EGPWS), windshear warnings including predictive an reactive windshear alerts, and TCAS alerts, other surveillance functions may also b e included. In Fig. 4B, IHAS 220 module is configured as a line replaceable unit, or LRU, having access through one or more I/O modules 222 to and from other aircraft systems, including, for example, central computer 18. Aircraft power is supplied via a power supply module 224 to a power bus 226 accessible by all the processing functions. The processing functions include, for example, radar processing 228, TCAS/ATC processing 230, GPWS or EGPWS processing 232 as well as other surveillance functions 234. Radar processing 228 preferably has direct access to radar antenna inputs while TCAS/ATC processing 230 has direct access to transponder signals. IHAS LRU 220 module includes a fault tolerant network topology backplane bus ~~212~~ <u>236</u> of the invention that includes multiple sets of independent data communication networks. Each

processing unit 228, 230, 232, 234 has both transmit and receive privileges on each of two data lines included in a first data communication network and monitors transmissions on a second pair of data lines forming a second data communication network.

One preferred embodiment of the present invention provides additional processing redundancy by providing that the two pairs of individual data communication networks are used for data communication within and between two redundant sets of processing nodes in different physically isolated enclosures. In Fig. 4B, network topology backplane bus ~~212~~ 236 extends from the single IHAS LRU 220 module shown to a second redundant IHAS LRU 220' module having the same functional processing capabilities. Thus, radar processing 228, TCAS/ATC processing 230, GPWS or EGPWS processing 232 and other surveillance functions 234 are repeated in second IHAS LRU 220' module. Similar processing nodes included in second IHAS LRU 220' module have both transmit and receive privileges on each of two data lines included in the second data communication network and monitors transmissions on the pair of data lines forming the first data communication network.

Flexible Topology

Fig. 5 illustrates the flexibility of the fault tolerant backplane bus architecture of the invention disclosed in Figs. 4A and 4B. In Fig. 5, the network topology backplane bus architecture of Fig. 4 is combined with one or more stand-alone line replaceable units or LRU 302, each including one or more function modules 300^1 through 300^N. Modules 300^1 through 300^N may host multiple application functions that also share the backplane bus. In Fig. 5 two independent and isolated data communication networks "A" and "B" having data lines Ax, Ay and Bx, By, respectively, are shared by a first quantity of modules 300^1 through 300^N co-located in ~~a~~ the resource enclosure 302. Modules 300^1 through

On page 14, please amend the paragraph beginning on line 12 as follows:

LRU 304 receives transmissions from modules 300^1 through $300^{\cancel{n}N}$ in enclosure 302 on "x" data lines Ax and Bx and transmit data to modules 300^1 through 300^N on "y" data lines Ay, By. As described above, LRU 304 is restricted to receive only privileges on "x" data lines Ax and Bx, but has both transmit and receive privileges on "y" data lines Ay, By. LRU 304 uses its transmit and receive privileges on "y" data lines for local communication of private messages, broadcasting transmissions to modules and/or processing nodes, and receiving data transmissions from other LRUs, modules and/or processing nodes.

On page 18, please amend the paragraph beginning on line 30 as follows:

Fig. 7B illustrates one embodiment of the invention using federated topology backplane bus architecture and incorporating the microprocessor based systems of the aircraft IHAS 10 system, shown in Fig. 1. In Fig. 7B, IHAS 460 system is configured as multiple line replaceable units or LRUs providing processing for applications of any criticality level form non-essential to flight critical. Each LRU includes a power supply module 464 providing aircraft power to the processing node and an I/O module 466 for communication with other aircraft systems. The processing functions of IHAS 460 system are provided individually in, for example, LRU 462, LRU ~~464~~ 465, LRU ~~466~~ 467, and LRU 468. For example, LRU 462 includes radar processing 470; LRU 462 includes TCAS/ATC processing 472; LRU ~~464~~ 465 includes GPWS or EGPWS processing 474; while LRU 468 includes other surveillance functions 476. Radar processing 470 preferably has direct access to radar antenna inputs while TCAS/ATC processing 472 has direct access to transponder signals. IHAS system 460 is configured using a fault tolerant federated topology backplane bus of the invention that includes multiple sets of independent data communication networks. First independent data communication networks 480 is local to radar processing LRU 462 for communication within the processing node. As shown, each other LRU ~~464~~ 465, LRU ~~466~~ 467 and LRU 468 include similar independent data communication networks local to the respective LRU for communication within the processing node. Second data communication network 482 is accessed in a receive/transmit mode by each LRU 462. Each LRU 462 has both transmit and receive privileges on each of two sub-busses included in second data communication network 478.

LRU 462, ~~464~~ 465, ~~466~~ 467 and 468 and any additional LRU containing additional processing nodes are optionally co-located in a single resource enclosure or cabinet 484. Additionally, according to one preferred embodiment of the present invention, additional processing redundancy by providing that one or more flight critical processes are provided in at least two redundant sets of processing nodes located in different physically isolated enclosures (not shown). When processing nodes are located in two or more different physically isolated enclosures, fault tolerant data communication bus 482 optionally extends between the individual enclosures and is preferably time-shared by the processing nodes of each LRU.